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Some Effects of Quebec Health Insurance

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Abstract

Universal compulsory health insurance (Quebec Health Insurance, QHI) was introduced in the Canadian province of Quebec on November 1, 1970. A series of surveys was carried out in the Montreal metropolitan area before and after the introduction of the universal health insurance plan to study its effect on four major aspects of health services: use of physician services by the general population (two household surveys, 1969–1970 and 1971–1972); the workload of physicians (telephone interviews, two study periods in 1969–1970 and 1971-1972); the use of emergency rooms (two periods of study included 1966–1970 and 1971–1973); and a hospitalization and surgical study (hospital separation rates and surgical procedure rates for two periods of study, 1966–1970 and 1971–1974). The comparison between before-and-after findings of the same surveys gives a measure of change in the delivery of health services as a direct consequence of national health insurance.

Results of this study indicate no overall increase in the utilization of physicians' services as a result of the introduction of universal health insurance in Quebec, but a considerable redistribution of use, noteworthy for increased use by persons in low-income families, resulting in relative parity of use across socioeconomic levels. Physicians' average work day declined from 10.3 hours before QHI to 8.8 hours following, with, however, increased patient load resulting from a reduction in home visits and telephone consultations (for which QHI does not pay). A marked increase in the use of emergency rooms was noted following the introduction of QHI, and there was some increase in certain elective surgical procedures. No general conclusions can be drawn from this study, however, concerning the effect of QHI on the health of the population.

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RESEARCH DIGEST SERIES

Some Effects of Quebec Health Insurance

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The more detailed final report, *Some Effects of National Health Insurance in Quebec,* may be purchased from the National Technical Information Service, Springfield, VA 22161 (tel.: 703/557-4650) (both in paper and in microfiche), order number PB 267 483.

NCHSR publications are available on request from NCHSR, Publications and Information Branch, Room 7-44, 3700 East-West Highway, Hyattsville, MD 20782 (tel.: 301/436-8970). Current NCHSR publications are listed inside the back cover.

Foreword

This is a summary of the findings from a descriptive study of changes occurring in public utilization of physicians' services and in physicians' working habits following the introduction of a universal compulsory health insurance plan in Quebec, Canada, in November 1971. A comparison of hospital emergency room use, hospital separation rates, and surgical procedure rates prior to, and following the introduction of universal insurance coverage was an integral part of this study.

Many of the findings from this study have been published elsewhere, as articles in English or French-language journals, but until now the results of the entire study have not been available in a single English-language publication. Additionally, tests of statistical significance, not previously reported, are included here.

While the interpretation of findings are, of course, solely those of the authors, the purpose for the inclusion of this monograph in the National Center for Health Services Research Digest Series is to supplement other national health insurance-related research findings with those contained here concerning the Quebec experience, in the hope that it may provide information of value to policymakers, other researchers, and to the health care community in general.

Gerald Rosenthal, Ph.D.
Director

January 1979

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Introduction

More and more governments are providing comprehensive medical care for their people. Some countries have introduced universal health insurance schemes while others finance the service mainly or entirely from taxation. Few of these major social changes have been studied objectively to measure their impact on the quantity or quality of care. When the government of Canada passed legislation to provide 50% of the cost of provincial health insurance which complied with certain conditions, it was reasonably certain that the Province of Quebec would introduce an acceptable scheme within a year or two. At that time, the authors at McGill University drew up research plans, helped by Dr. Hatcher, University of Montreal, with the aim of recording any important changes that occurred in Quebec.

Subsequently, in 1969, these plans formed the basis of a research grant to the University of Pittsburgh, and a contract to McGill for studies in metropolitan Montreal. The main aspects selected for study were: 1) utilization of physicians' services, 2) work of physicians, 3) use of emergency rooms, and 4) hospitalization. The method involved interview surveys of households, physicians and persons attending emergency rooms before Quebec Health Insurance (QHI), which were repeated in an identical fashion after it was in effect. Hospitalization was studied using records provided by the Quebec Ministry of Social Affairs. These surveys have already been reported (*1–5*) and are the subject of other papers (*6,7*) and a monograph in preparation.

The research was implemented rather rapidly in the early summer of 1969 because it seemed possible that QHI might be introduced within a year. Fortunately for us, there were delays and QHI went into effect on November 1, 1970, three months after the first round of surveys had been completed.

Household surveys were conducted to compare medical care before and after QHI as seen by the citizens; that is, to provide information not only about sickness behavior and utilization of health facilities, but also on public attitudes.

Because the focus of the surveys was on the direction and magnitude of change, particularly as related to population sub-groups, a fairly large sample was required. The sampling design provided for 12 independent monthly samples, each comprising 500 dwelling units drawn from the Montreal metropolitan area before QHI, and 12 such samples after. These were self-weighting stratified cluster samples. Half the sample in the second survey was composed of dwelling units which had been visited in the first. The two interviewing periods started on August 1, 1969 and August 1, 1971. Each continued for 12 months and, as already stated, identical questionnaires were used. Since each month's sample was randomly drawn from the entire metropolitan area, inferences about the entire area could be made. The overlap of dwelling units in the two samples permitted a panel study and also served to slightly reduce the standard errors of the difference in results of the two surveys.

In calculating standard errors and the significance of differences observed between the first and second surveys, variances were first calculated for each month, and then combined for all 12 months to provide an overall estimate of variance. This resulted in some stratification effect for those variables that differed from month to month. Each monthly sample consisted of a random sample of 20 census tracts stratified by median family income and drawn with probability proportionate to size. A fixed size sub-sample of dwelling units was drawn from each census tract. Because of variations in response and in number of persons within dwelling units, monthly variances were calculated as for unequal clusters, with each census tract considered a cluster (*8*). This sampling design resulted in a variance roughly twice as large as for simple random sampling. Because of the complexity of the various calculation, it was not carried out for every variable, and in some instances, variances and levels of statistical significance are estimated from the design effect. That is, variances were calculated as for simple random sampling and doubled to reflect the effects of clustering in the sample selection. Also, the effects of the overlap were not taken into account in estimating the variance of differences since these effects were small.** In the following tables statistically significant differences are noted along with the basis for the variance calculations. In general, where the population was extensively subdivided, differences are not statistically significant due to the reduction in sample size.

A total of 6,000 dwelling units were listed for interviews before the introduction of QHI and 6,000 after. Visits were first made by a commercial household survey organization, with three call-backs. The interviews took an average of 50 minutes per dwelling unit and were conducted in French or English by bilingual interviewers. These interviewers achieved an 85.7% completion rate in the first survey and 87.5% in the second. For those dwelling units in which they were unsuccessful but which appeared to be occupied, the interview assignment was turned over to a public health nurse who visited the home and attempted to complete an abbreviated questionnaire. By this means, the response rate was raised to 92.5% in the first survey and 95.3% in the second.

At each dwelling unit, information was obtained for all residents. A special questionnaire was used for children under 17 years of age and the mother, or occasionally, another adult person was asked to respond. Proxy respondents were also used for certain items in adults, but for most questions, information was obtained directly from each adult. This sometimes required a revisit or contact by telephone.

Physician visits

The distribution of physician services before and after they became "free" on November 1, 1970, with percentage change is shown in Table 1. Visits by and to the doctor are expressed as annual rates by place of visit. Hospital inpatient and health department clinic visits are excluded. Respondents were asked about physician visits and illnesses in the preceding two weeks. Roughly half the visits to doctors were reported in relation to such illness. Table 1 shows that there was no overall change in physician visits reported before and after health insurance, but some redistribution by type or place.

Table 1. Physician visits per person per year before and after QHI by type of visit showing percent change

Type of visit	First survey (1969-70)	Second survey (1971-72)	Percent change
All visits	5.06	5.05	None
Telephone	.81	.70	−13.6
Face-to-face contacts	4.25	4.35	+ 2.3
Office	2.36	2.73	+16.7*
Hospital outpatient and emergency room	1.18	1.17	None
Home	.44	.18	−59.1*
Other visits	.27	.27	None

* Statistically significant ($P < .05$) based on calculated variances

** The reduction in the variance of a difference is proportional to $1 - PR_{x,y}$, where P is the proportion of the sample in the overlap and $R_{x,y}$ is the simple correlation between a particular variable in sample 1 and sample 2. In this study $P = .26$ and $R_{x,y}$ was generall less than .2. Thus, the variance was generally reduced by less than 5% due to the overlap.

Table 2 describes physician visits in each of five groupings by family income. The information was obtained by asking respondents to which of a series of income categories the household belonged. The percentage changes in utilization by income groups imply that there were economic barriers to medical care in Montreal prior to QHI. The removal of direct cost was associated with relatively fewer services to higher income groups, accentuating further the inverse relationship between family income and physician visits which already existed.

Table 2. Physician visits by annual family income showing percent change

	First survey (1969-70)		Second survey (1971-72)		
Annual family income ($)	Number of interviews	Visits per person per year	Number of interviews	Visits per person per year	Percent change*
Under 3000	1590	6.6	1231	7.8	+18.2
3-4999	2400	5.5	1741	6.0	+ 9.1
5-8999	6921	4.7	6098	4.7	None
9-14,999	3889	5.1	4716	4.6	— 3.9
15,000+	1327	5.3	2274	4.8	— 9.4
Unknown income	2360	4.4	2273	4.2	— 4.5

* While none of the individual changes for income groups is statistically significant, the regression of visits per person per year on income in the first survey differs significantly from the regression in the second (t test of significance of difference on slope based on calculated variances)

In the interval between the two surveys, annual family income increased by about $1,000, so that the fixed income classification had a somewhat different meaning in the second survey than in the first. There was a decline in interviews in the lowest income groupings and a corresponding increase in the highest. Unfortunately, income categories used in the household questionnaire were too broad to allow for adjustment. The interpretation of Table 2—that physician utilization shifted to lower income groups—can be checked, however, by examining some population characteristics which are associated with income but would not have changed much. Table 3 shows the change between the first and second surveys in four education groupings. This generally supports

Table 3. Physician visits by educational level showing percent change*

	First survey (1969-70)		Second survey (1971-72)		
Years of education	Number of interviews	Visits per person per year	Number of interviews	Visits per person per year	Percent change
Under 11	7024	5.7	6596	6.1	+ 7.0
11-12	2911	4.3	3164	4.7	+ 8.5
13 and over	2246	5.3	2627	4.6	—15.2

* None of the differences shown are statistically significant

the findings in Table 2, with lower education and presumably lower income associated with an increase in physician visits, and higher education with a decrease in visits.

Table 4 shows physician visits per person in two broad annual income groups, under and over $9,000. In both there were fewer physician visits at ages under 17. This unexpected finding resulted from a reduction in telephone contacts (see Table 1) and in hours worked by pediatricians, described in the next section. Excluding telephone contacts, the decline at this age was 5.6% in the lower and 9.8% in the higher income group. Generally, the pattern of change shown in Table 4 is consistent with the notion that economic barriers existed prior to QHI.

Table 4. Physician visits per person per year by age and annual family income showing percent change*

	Annual family income						
	Under $9,000			$9,000 and above			
Age	First survey	Second survey	Percent change	First survey	Second survey	Percent change	Total** percent change
Under 17 . . .	4.5	4.2	− 6.7	5.4	4.6	−14.8	−6.8
17-64	5.2	5.6	+ 7.7	4.9	5.0	+ 2.0	+2.0
65 and over . .	7.5	8.5	+13.3	7.7	7.1	− 7.8	+5.2

* None of the differences shown are statistically significant
** including unknown income

An examination of more narrowly defined age-groups showed that there was a large increase, 21.9%, at ages 17–24 years, which occurred mainly among young women living away from home. There was also a decline 8.6%, in visits at ages 5–16 years. During the school months, September-May, 10.4% of all children in the first survey had an absence from school in the year before QHI, compared with 9.6% the year after. Thus, higher levels of illness among children in 1969–70 than 1971–72, may have been responsible in part for the decline in visits following QHI.

Availability

Delays in obtaining an appointment were recorded for adults who sought to consult a physician. Before QHI the average delay was six days. Those in the $5,000–$8,999 family income category experienced the shortest delay—5.3 days—and those in the highest income group, $15,000, and over the longest—6.6 days. After QHI the average delay increased to 11 days. Persons with a family income of less than $3,000 suffered the least delay—8.5 days—and those with an income of $15,000 and over, the greatest—12.3 days.

The average time waited in the doctor's office increased from 36 to 40 minutes. An income gradient was present before QHI with those with the low-

est income waiting an average of 52 minutes and the highest group, 24 minutes. After QHI, the corresponding figures were 51 minutes, and 33 minutes, respectively. In all but the lowest income category people had to wait longer.

Need

One group identified as potentially in need of care comprised persons ill in the two-week period before the household interview. About half of all physician visits in the two weeks prior to the interview were reported by this group (49.3% before and 48.3% after). There was a slight decline in overall illness levels between the first and second surveys. Illness levels were inversely related to income for adults, which also partly explains the gradient in physician visits per person per year shown in Table 1. For children, on the other hand, there was little or no relationship between illness and family income in either survey. For the total population, 47.8% of persons with an illness saw a doctor before QHI. This rose to 51.5% after QHI. Before QHI, ill persons in lower income groups were less likely than those in higher income groups to consult a doctor, but this gradient disappeared or was reversed after QHI.

It is uncertain how many illnesses in the two weeks before interview warranted medical care, or whether persons who received care benefited from it. For this reason, selected symptoms were listed for which it was believed a physician's advice should be sought and which were expected to occur sufficiently frequently for changes to be observed.

The symptoms chosen are shown in Table 5 together with the categories of persons questioned about whether they had suffered from them during the previous 12 months. Those who reported these symptoms were asked whether a doctor had been seen. Questions also were asked about prenatal and postnatal care. Women aged 45 years or less who were married or had children, were asked whether they had given birth to a live or stillborn child within the past year, and if so, when they had their first prenatal examination, whether they had a postnatal examination, and if the baby was examined after leaving the hospital.

Table 5. Data on persons with selected symptoms according to income group and doctor visits for the symptoms

Question	Survey	Number of persons questioned	Percent with symptoms				Percent of those with symptoms who consulted a doctor			
			$5,000	$5,000 $8,999	$9,000 & over	All	$5,000	$5,000 $8,999	$9,000 & over	All
All adults:										
Cough for 2 weeks or more	1969–70	11092	23.9	17.4	14.8	17.6	50.7	53.4	60.4	54.1
	1971–72	11458	25.9	18.5	18.1	19.2	60.2*	62.2*	62.2*	61.6*
Loss of weight	1969–70	11084	16.3	11.7	8.2	11.3	50.1	52.0	52.2	51.8
	1971–72	11463	15.4	9.5	8.1	9.6	66.6*	65.0*	68.5*	66.7*
Backache or sciatica	1969–70	11084	27.9	18.2	15.4	19.3	52.7	51.0	58.0	54.6
	1971–72	11460	29.5	19.3	13.2	19.5	72.0*	70.9*	72.0*	71.6*
Men 45 years of age or more:										
Breathlessness or chest pain on exercise	1969–70	1880	35.7	21.6	19.1	24.1	74.4	65.4	73.6	71.3
	1971–72	2025	42.3	24.9	21.8	26.8	75.8	76.6	80.2	78.2
Difficulty passing urine	1969–70	1879	8.5	6.8	5.2	6.3	77.5	80.5	79.3	77.3
	1971–72	2021	11.8	7.1	4.0	6.2	80.4	72.5	90.3	81.7
Women 25–44 years of age:										
Irregular periods or bleeding between periods	1969–70	2447	23.8	18.5	16.8	18.5	76.7	72.7	88.9	79.5
	1971–72	2489	21.6	16.9	18.0	17.6	76.9	87.7*	88.2	86.6*
Women > 25 years of age:										
Stiffness, pain, or swelling of joints	1969–70	4527	25.2	17.1	16.7	19.0	63.2	63.8	73.8	66.4
	1971–72	4699	34.7	19.9	17.7	22.1	76.4*	76.9*	77.2	76.5*

Table 5. Data on persons with selected symptoms according to income group and doctor visits for the symptoms—Continued

Question	Survey	Number of persons questioned	Percent with symptoms				Percent those with symptoms who consulted a doctor			
			$5,000	$5,000 $8,999	$9,000 & over	All	$5,000	$5,000 $8,999	$9,000 & over	All
Difficulty controlling water	1969–70	4523	13.5	9.3	6.8	9.4	70.4	76.4	80.0	74.9
	1971–72	4697	13.3	9.9	8.3	9.6	79.5	83.3	84.9	82.0
All > 65 years of age:										
Foot trouble or difficulty getting around	1969–70	943	31.2	28.9	31.4	29.8	61.6	76.2	81.6	70.5
	1971–72	915	37.4	33.2	30.5	34.5	76.4*	81.0	69.8	77.2
All children (< 17 years of age):										
Measles	1969–70	5814	6.3	4.4	3.3	4.2	58.2	76.0	75.4	72.1
	1971–72	5506	4.8	2.1	1.9	2.3	69.7	59.5	74.4	69.8
Discharging ear	1969–70	5815	5.4	5.3	5.3	5.3	74.1	78.2	89.0	81.4
	1971–72	5504	7.3	4.8	4.7	4.8	86.0	67.3	74.4	83.8
Tonsillitis or fever with sore throat	1969–70	5813	24.0	20.6	23.8	21.4	58.0	67.3	74.4	68.0
	1971–72	5501	25.9	22.3	24.8	23.5	72.6*	75.9*	78.8	76.5*
Bronchitis	1969–70	5816	7.9	7.6	6.4	6.9	74.1	77.2	83.6	79.0
	1971–72	5507	8.4	7.4	7.6	7.2	74.1	89.5*	84.6	85.5
Diarrhea or vomiting lasting for > 1 day	1969–70	5817	12.7	11.8	10.7	11.2	55.9	53.4	66.5	57.8
	1971–72	5505	11.2	10.9	11.3	10.6	74.0	66.4*	73.5	71.1*

* Differences statistically significant ($P < .05$) based on estimated variances

The percentage of persons who reported the selected symptoms during the 12 months prior to the interview was roughly the same in the two surveys for all income groups. The one exception was measles which was less frequent in the first survey. Apart from foot troubles in old people, symptoms relating to adults were most frequently reported in families with the lowest incomes, and less frequently as family incomes rose. The percentage of persons who consulted a doctor increased after QHI. For many of the symptoms, the rise was greater in the lowest income group. Again, it appeared that before QHI, there was an economic barrier to seeking a physician's advice for many of the symptoms. In children, the differences according to income group in the frequency with which symptoms were reported were less than in adults, and there was less evidence of an economic barrier before QHI. This is in line with the overall decline in services to children.

Table 6 shows findings related to women who reported a live or stillborn baby during the 12 months prior to interview. In the second phase, more women reported having their first prenatal examination before the third month, and more mothers received postnatal examinations or had their babies examined after returning from the hospital. These improvements were all shown to a greater extent by women in lower income families. The income gradient in frequency of these examinations was much less after QHI than before. These findings were somewhat obscured by the fact that some of the babies reported in the second survey were conceived before QHI came into effect.

Table 6. Number of pregnancies resulting in live and still births in the 12 months preceding the interview, proportion who had no check-up after pregnancy, and time of first prenatal visit by annual family income

Annual family income ($)	*Survey*	*Number of pregnancies**	*First prenatal visit before:*		*No check-up after pregnancy*
			5th month	*3rd month*	
			%	%	%
Total	1969–70	268	41.0	82.8	34.0
	1971–72	215	54.9*	92.6*	20.5*
Under 5,000	1969–70	64	26.6	73.4	35.4
	1971–72	32	56.2*	93.8*	21.9
5,000–8,999	1969–70	120	45.0	86.7	36.7
	1971–72	89	52.8	89.9	27.0
9,000 and over	1969–70	63	49.2	88.9	24.6
	1971–72	80	53.8	95.0	13.8
Unknown	1969–70	21	38.1	71.4	40.9
	1971–72	14	71.4	92.8	14.3

* Differences statistically significant ($P < .05$) based on estimated variances

Overall, only about a quarter of those who were ill and did not see a doctor would have liked to do so. For the total population, this proportion dropped slightly between the first and second survey, from 24.6% to 22.6%. The sharpest drops were in the lowest income group—51.4% to 33.3%. Smaller declines occurred in all other income categories, except families earning $9,000–

$14,999. Despite the decline following QHI in all age-income groupings under $9,000, this apparent unmet need continued to be greatest for low income groups. However, the impact of QHI was probably not entirely felt at the time of the second survey, and further changes in the distribution of medical care may have taken place since then.

Patient satisfaction

In the second survey, all adults were asked, "Since Quebec Health Insurance came into effect on November 1, 1970, do you think the kind of medical treatment doctors give people has improved, stayed the same, or is worse than it used to be?" Eight percent of adults thought it had improved and 30% thought it was worse. There was an association between income level and the proportion of the public who thought care improved, with higher income people less likely to see improvement. In both surveys everyone was asked, "Have you been postponing or putting off any medical or hospital care you need at this present time?" Persons of lower income had more frequently been putting off care before QHI than those in the upper income groups. The range before QHI was from 19.5% to 4.3%, while afterwards the range was from 11.6% to 4.0%.

Most adults thought the care they had received at their last visit to a doctor was the best possible both before and after QHI (91.4%). The higher income families were rather less satisfied after health insurance.

Comment

It was evident from the redistribution of physician services among income and age groups, that before QHI economic barriers existed. These were largely removed by QHI, and a considerable increase in the utilization of physician services by lower income groups took place. Given the relatively fixed supply of services, which is discussed in the next section, there was a shift from higher income to lower income groups.

Of particular significance is the increased frequency with which physicians were seen for a series of important medical symptoms. This strongly suggests the removal of economic barriers to medical care could well have improved the general health level of the population.

Clearly, some segments of the population benefited more than others. The greatest benefits were to young persons with pressing problems—such as young women living away from home, unskilled manual workers, persons over 65 years of age (particularly males), children from poor families, pregnant women and probably the newborn. Cost almost disappeared as a reason for not seeing a doctor, but was replaced by reasons related to time, convenience, and probably other factors less easily defined. Persons in higher income groups appear to have lost, though not necessarily suffered, as a result of QHI.

Work of physicians

Before Quebec Health Insurance (QHI), physicians were remunerated by patients, private health insurance, or public assistance. The change to a system in which they were paid entirely by the government so that their services were 'free' to the patient was bound to affect the pattern of medical practice and likely to increase the demand for physician services. To meet this demand, it was expected that physicians would change the distribution of their work between office and hospital, perhaps increase their ancillary help, and probably reduce unremunerated work such as telephone consultations. The number of physicians available might also be affected. Physicians who disliked the plan could leave the province for other Canadian provinces or elsewhere where the system of medical care was more acceptable to them.

In order to record changes in the volume and distribution of work, samples of physicians were interviewed during two eight-month periods before and after QHI was introduced: October, 1969 to May, 1970, and October, 1971 to May 1972. The samples were randomly selected, with stratification by specialty, from lists of licensed physicians in the Montreal area compiled by the Quebec College of Physicians and Surgeons.* Each sample was to comprise about 470 physicians in active clinical practice, of whom 150 were to be general practitioners and 40 each of eight specialty groups—general surgeons, other surgeons, general internists, other internists, obstetricians, pediatricians, psychiatrists and ophthalmologists.

Since these are simple random samples within specialty groupings, variances are easily calculated with appropriate correction for instances where the sample size approached the population size. Where all specialty groupings (including general practitioners) are combined, variances were calculated as for a stratified random sample (*8*). In the following tables, statistically significant differences are noted.

Names of physicians who fell in the sample were checked against records at the Quebec College of Physicians and Surgeons * and certain categories removed. These comprised physicians in residency training together with those who had left the province, were no longer licensed to practice, or were over 70 years of age. When the physicians remaining in the sample were contacted, further exclusions were made if it was found that they had discontinued practice or worked full-time in laboratory medicine, public health, industrial medicine, academic medicine, or as hospital residents. After these exclusions, the

* now Corporation Professionelle des Medicins du Quebec

number of physicians in the first survey was 497, and in the second, 477.

The interviews in both surveys were conducted by telephone, Monday through Friday, by the same experienced and fluently bilingual interviewer. The physicians selected each day constituted a stratified random sample of the whole. A standard questionnaire was used which took 15 to 20 minutes to administer. Questions were asked about practice arrangements, the work that they had done in the 24 hours ending at 6:00 a.m. on the day of the interview, and the number of patients seen in different locations. A separate set of questions was asked about the average week and weekends. Each interview was preceded by a letter to the physician explaining the nature of the study and requesting his cooperation. The option of a personal visit was offered, but very few doctors chose it. Any doctor who declined to give information was visited or telephoned by a physician member of the research team, sometimes with success. The questionnaire was completed for 93% of the sample in the first survey, and 94% in the second.

Number and specialty

Table 7 shows for general practitioners and for each specialty group studied, the estimated number of licensed physicians in active practice in the Montreal area during the period October–April for the years 1969–1970 and 1971–1972, the number of these in the sample, and the number in the sample who were actually interviewed. The estimates were made by applying the proportion of physicians in the sample found to be in active clinical practice (for general practitioners and specialists separately) to all physicians listed in the directories. This indicates little change in the total number of practicing physicians.

Table 7. Number in sample and number interviewed before and after QHI and estimated number of physicians in active clinical practice in the Montreal metropolitan area by specialty

Specialty	First survey (1969-70)			Second survey (1971-72)		
	Number in sample	Number interviewed	Estimated number in active practice	Number in sample	Number interviewed	Estimated number in active practice
All physicians	497	463	2424	477	448	2441
General practitioners	157	143	950	137	132	957
All specialists	340	320	1474	340	316	1484
General surgeons	42	38	209	39	32	178
Other surgeons	42	39	242	44	41	305
General internists	40	37	198	40	38	171
Other internists	41	39	259	42	41	273
Obstetricians	45	42	166	42	41	180
Pediatricians	43	42	130	40	38	123
Psychiatrists	44	41	202	51	49	168
Ophthalmologists	43	42	68	42	36	86

In both surveys, 15% of the physicians were under 35 years of age, 64% were 35 to 54 years of age, and 21% were 55 years of age and over. About 50% had graduated at the University of Montreal, 22% at McGill University, 10% at Laval University, and 19% outside the province.

The percentage of physicians with hospital admission rights declined slightly in the second survey, from 95.9% to 72.2%. The percentage in group practice remained the same (31% and 32%). The percentage of physicians with reciprocal arrangements with other doctors for off duty times declined. For night duty, the rates fell from 65.3% to 63.2%; for weekends, from 68.4% to 64.9%; and for vacations, from 89.3% to 75.2%. On the other hand, for study leave the figures rose from 18.4% to 30.5%. Full days vacation in the year preceding the interview, excluding public holidays, increased from 26.8 to 30.5 days.

The percentage of physicians with a secretary increased from 60% to 71%, but the percentage who employed a bookkeeper fell from 7.7% to 3.2%, probably because of the simplification of billing and accounting procedures as a result of QHI. There was a small increase in the percentage of doctors who employed a nurse, from 14.9% to 16.8%, and the proportion of employed nurses who were registered increased slightly. More nurses collected specimens and took blood pressures after QHI, and fewer gave injections, probably because to claim a fee, the physician is required to give the injection himself. Also, fewer nurses changed dressings and took medical histories.

Some physicians in the sample who were in active practice had not worked on the day before the interview (or Friday if the interview was on a Monday). The number of these increased from 4 to 21 after QHI. This increase projected to the total physician population, effectively reduced the size of the physician work force. Thus, although the estimated number of practicing physicians rose from 2,424 to 2,441, the number actually at work on a given workday may have declined slightly from an estimated 2,403 to 2,327 physicians.

Table 8 shows the mean hours worked for general practitioners, specialists, and for each of the eight specialty groups, before and after QHI. The variation in hours worked among general practitioners and physicians in specialty groups was greater before QHI than after. QHI appeared to have brought about some uniformity in working hours. Methodologically, it was of interest that physicians reported longer hours at work when asked about a working week than when asked about a previous day. In the first survey, the estimated working week based on questions about the previous day was 51.5 hours, based on questions about the average week, it was 55 hours. In the second survey, the figures were 44 hours and 50 hours, respectively. The information obtained about the previous day may be more valid since recall problems were minimized.

For each 24-hour period ending at 6:00 a.m. the day of the interview, (Monday-Friday), we determined how many working hours were spent by the doctor seeing patients in the office, hospital, clinic, or at home, and how many hours were spent doing paperwork. Time spent in the office increased overall

Table 8. Hours worked on day preceding interview by physician specialty, physicians in active practice in the Montreal metropolitan area before and after QHI

Specialty	First survey (1969-70) Hours worked	Standard error	Second survey (1971-72) Hours worked	Standard error	Change (hours)
All physicians	10.3	.14	8.8	.16	−1.5*
General practitioners	10.0	.28	8.6	.30	−1.4*
All specialists	10.6	.16	8.9	.18	−1.7*
General surgeons	11.2	.45	8.5	.43	−2.7*
Other surgeons	10.4	.46	9.2	.51	−1.2
General internists	9.5	.42	9.2	.36	−0.3
Other internists	10.1	.44	8.3	.54	−1.8*
Obstetricians	10.8	.41	9.1	.45	−1.7*
Pediatricians	10.9	.35	8.4	.49	−2.5*
Psychiatrists	11.7	.39	9.6	.37	−2.1*
Ophthalmologists	10.0	.27	8.8	.33	−1.2*

* Statistically significant ($P < .05$)

by half an hour. Both general practitioners and specialist groups spent more time in their offices, with the biggest increase reported by general practitioners (1.8 hours) and obstetricians (1.3 hours). At the same time, there was a decline overall in time spent working in other settings. All groups devoted much less time to home visits with pediatricians showing the largest change. Telephone consultations declined sharply in every group, and though pediatricians continued to spend more time on them than other groups, they did so by a much narrower margin than before QHI. Time spent in hospital visits and on correspondence was also reduced. To the extent that correspondence represents "paperwork," the finding is of interest since many physicians had anticipated an increase.

Patients seen

The total number of patient contacts per weekday by physician specialty was estimated from the reports of physicians in the study by place of contact. The decline in hours of work was accompanied by a 9% reduction in the total volume of medical services (including telephone consultations) delivered after the introduction of QHI, from an estimated 82,262 patient contacts per day (Monday-Friday) to 74,463 per day. Increases in patient contacts were reported only by "other" surgeons and ophthalmologists. Contact with patients in the office increased for general practitioners especially and for all specialty groups except general surgeons, pediatricians, and psychiatrists, with the largest increase among "other" surgeons. Home visits declined sharply from 2,914 visits per day to 1,080 per day. This decline held for general practitioners and for all but one specialty group. Telephone consultations declined for every physician grouping, and visits to hospitalized patients fell overall, with a fairly large

decline for general practitioners. The only increase was among "other" surgeons in active practice shown in Table 7. Little change occurred in the number of patients seen in outpatient clinics, but some changes occurred among specialty groups. General practitioners increased their work there while "other" surgeons and psychiatrists substantially reduced theirs.

For the periods before and after QHI, telephone contacts represented a large proportion of total patient contacts. When telephone contacts were excluded, there was an increase from 56,613 to 59,352, due to the large increase in office visits which rose from 23,840 to 31,509.

The number of physician visits per year calculated from the physicians' survey was higher (Table 9) than reported in the household survey (Table 1). This was due mainly to the much higher number of telephone contacts reported by the physicians. The percentage change did not differ greatly between the physicians' and the household surveys.

Table 9. Physician visits per person per year before and after QHI by type of visit as reported by physicians showing percent change and percent change as reported in household survey

	Physician survey			*Household survey*
Date of visit	*First survey (1969-70)*	*Second survey (1971-72)*	*Percent change*	*Percent change*
All visits	6.52	6.03	— 7.5*	None
Telephone	2.67	1.57	—41.2*	—13.6
Office	2.48	3.28	+32.2*	+16.7*
Clinic	1.07	1.07	None	None
Home	0.30	0.11	—63.3*	—59.1*

* Statistically significant ($P < .05$)

It was possible to compare the physicians' report on the number of patients seen according to location with the number of claims made to the Quebec Health Insurance Board (QHIB) by the same physician. This comparison was restricted to those patients who could be identified by the QHIB—70% of the total. The 21 physicians who did not see any patients on the previous day were excluded, as were a number who had not made personal claims to the QHIB and some who were not identified in the QHIB files. The average number of patients seen per weekday according to the QHIB files was compared with the number that the same physician reported for the previous day.

For the general practitioners, pediatricians and "other" internists, there was a close similarity in the data from the two sources. Other specialists, especially surgeons and obstetricians, made fewer claims than the number of patients they reported that they had seen. In the case of hospital inpatients,, there was a particularly large difference. This was probably due to the fact that visits made in the course of care for an operative procedure or a delivery were not payable separately. This same reason probably accounted for the much lower number of claims for office visits.

Patients use of the system

Physicians were asked, "Do you recall seeing any patients between 6 a.m. yesterday and 6 a.m. today who you think sought medical advice without reasonable cause?" Before QHI, 1.1% of patients seen fell into this category, and after QHI, 1.9%. For the most part, these patients were described by physicians as suffering from anxiety or trivial complaints.

Physicians were also asked whether they saw anyone during the 24 hours who should have come sooner. The proportion of these fell from 2.8% before QHI to 1.8% after.

Comment

It was not predicted that the average work week of physicians would decline by 8½ hours, and the reasons for this are not clear. With the advent of "free" medical care, the attitude of physicians towards their work may have changed, and they may have questioned the necessity of working 50 or 60 hours a week. It is also possible that physicians found they could earn as much or more after QHI by working a shorter week.

The increased time spent in the office probably reflects increased pressure for service by patients, as predicted, and despite more time spent in their offices, physicians were able to devote less time to each patient seen. The increase in the percentage of physicians employing secretaries and nurses may indicate an attempt to cope with an increased patient load and requirements of the QHIB. Decreases in time spent in hospital and home visits, and in telephone consultations, may reflect greater control of the physician over these activities. The decline in telephone contacts may have been due to fewer calls initiated by the patient since after QHI, medical advice could be obtained without charge in the physician's office. Telephone contacts with the physician were probably discouraged because they were not payable under the fee schedule.

In view of the opposition to QHI by some physicians in the province, the political situation at the time QHI was introduced, and the opportunities for doctors to leave Quebec, it is of interest that there was only a small exodus of physicians and that the overall number increased slightly. It is noteworthy that since 1971, the number of practicing physicians has increased substantially. This was no doubt due to the increased enrollment of medical students which took place in the 1960s.

Utilization of emergency rooms

QHI enabled all residents to visit a private doctor without cost. It was therefore anticipated that there might be a reduction in the use of hospital emergency rooms for non-urgent conditions. Two studies were made of the use of emergency rooms and general outpatient clinics where no letter of reference from a doctor was required. First, interview surveys were conducted before and after QHI in selected hospitals, and second, a study was made of attendance rates at all hospitals in metropolitan Montreal.

Interview study

Surveys were carried out between January and June, 1970, and for the same months in 1972 in six hospitals considered to be reasonably representative of hospitals in metropolitan Montreal. The surveys were conducted in a closely similar fashion and covered sessions in each hospital so that rates of attendance could be calculated for each six-month period of study.

Persons who had an accident during the 24 hours before attendance were excluded. Even before QHI these attendances were "free" but other patients were usually required to pay a fee based on a means test. Bilingual nurses sought interviews with all persons who attended during the selected times for reasons other than an accident in the previous 24 hours. They interviewed patients before they saw the doctor, using a standard questionnaire. Interviews were completed for 82% of the 1,766 eligible for interview in the first period, and 93% of the 2,871 eligible in the second. Failure to interview occurred mainly because the patient had seen the physician first. The emergency room records were later reviewed to obtain information about investigations, diagnosis, treatment, and disposal. Illnesses were classified into three categories: emergent, urgent, and non-urgent (*9*).

There was no substantial difference in the demographic characteristics of emergency room attenders in 1970 and 1972, although more children attended in 1972. Reasons given by patients for attending the hospital at the time they did varied slightly in the two surveys. Before QHI, 42% said they came for reasons related more to convenience than to anxiety about their health, compared with 57% after QHI. The proportions classified as emergent, urgent, and non-urgent did not change after QHI.

The emergency room was more frequently identified as their usual source of care in 1972 than in 1970. A socio-economic gradient was evident both before

and after QHI, with lower socio-economic groups being the greater users. This may reflect the persistent tendency for physicians' offices to be located in more affluent areas of the city.

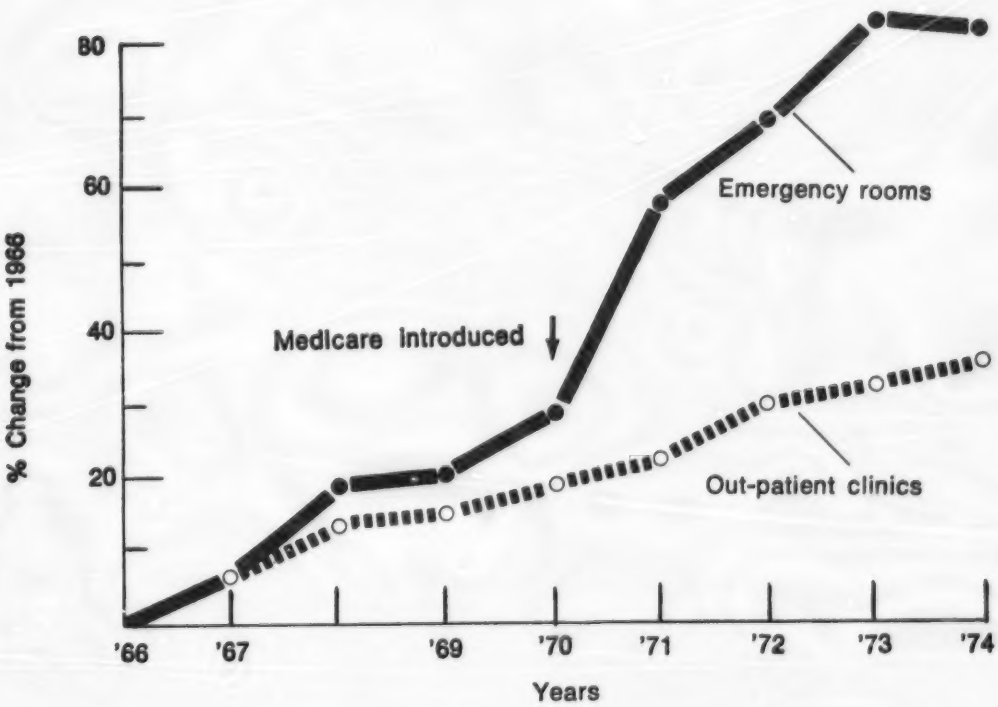
There was little change in the proportion of patients who had attempted to contact a physician before coming to the emergency room, 33% and 39%, respectively. Of those who attempted either to see a physician or speak to him by telephone, fewer were successful after the introduction of QHI—38% compared with 63% before. The diagnostic tests done, the treatment given, and the subsequent disposal of the patients were similar in both surveys.

Emergency room visits

Thirty-eight of the 42 hospitals in metropolitan Montreal provided the total number of visits to their emergency rooms and outpatient clinics for the period 1966-74. In the remaining four hospitals, which accounted in 1974 for 3.2% of total visits, earlier records were lacking. Estimates for these four hospitals were included in calculating overall rates of attendance for the population of metropolitan Montreal.

The emergency room visit rate per 1,000 population per annum rose from 299 in 1966, to 541 in 1974—an increase of 81%. The increase was mainly between 1970 and 1973 (Figure 1). For outpatient clinics, the mean yearly

Figure 1. Percent change in visit rates/1000 visits to emergency rooms and clinics of all metropolitan Montreal hospitals



percentage change was 4.8% between 1966 and 1970, and 2.4% between 1970 and 1974. There was no association between the rates of increase and hospital size, teaching, or non-teaching status, or predominantly spoken language.

Comment

The absence of change in the characteristics of persons attending emergency rooms or in the urgency with which they needed attention, suggests that the increased use of this facility was part of a general increase in demand. However, the substantial increase in use observed in 1971 suggests that in this year, there may have been a shift in the site of delivery of medical care from the physician's office to the emergency room.

Hospitalization

Comprehensive health insurance might, by providing better ambulatory care, be expected to reduce the need for admission to the hospital. On the other hand, health insurance might also result in a higher rate of detection of disease requiring hospital treatment. In order to examine any changes that might be attributable to QHI, hospital separations in the Province of Quebec were studied for the period 1966-1974. Magnetic tapes were supplied by the hospital insurance department of the Quebec Ministry of Social Affairs for separations in all but mental and tuberculosis hospitals. In order to make the task manageable, a 1:60 sample of separations was extracted and separately analyzed for persons residing in metropolitan Montreal and those living in the remainder of the province.

Rates of hospitalization

Hospitalization rates for the Province of Quebec have been gradually rising as have rates in other parts of Canada and the United States. However, for persons resident in Montreal, this was not so. Table 10 shows that rates were lower in 1966 in Montreal than outside and have been gradually falling. There was a substantial drop in the birth rate during this study, with a decline in deliveries in both populations. These, and accidents which remained constant in frequency, were excluded from the subsequent analysis. The remaining separations were categorized as medical or surgical according to whether a surgical operation was recorded. In 1966, the separation rate without operation was considerably higher in the rest of the province. In both regions the rates declined fairly steadily until 1972, after which there was a small rise.

Surgical operations

In Montreal, the surgical separation rates remained steady until 1972 and then increased slightly. In 1966, the rate for the rest of the province was a little higher than in Montreal. It rose irregularly showing a small peak in 1971 and a substantial one in 1973 which was maintained in 1974.

Certain operations were selected for study: two that were unlikely to be affected by QHI, namely, mastectomy and prostatectomy; two in which patients in need might have easier access to physicians, namely, operations for hernia

Table 10. Hospital separation rates (per 1,000 population) for Montreal and the rest of the Province of Quebec, 1966-1974

	1966	67	68	69	70	71	72	73	74
All separations:									
Montreal	119	116	119	110	105	100	92	100	94
Rest of province .	153	149	153	148	148	158	146	170	172
Deliveries									
Montreal	23	20	21	19	19	18	18	15	14
Rest of province .	26	23	23	22	22	21	21	23	24
Accidents:									
Montreal	8	8	7	7	6	6	6	6	7
Rest of province .	13	12	12	12	12	12	11	12	12
Remainder:									
(1) Without operations									
Montreal . . .	45	44	44	44	38	36	30	32	29
Rest of province .	66	65	64	62	62	63	56	65	66
(2) With operations									
Montreal . . .	43	43	47	44	42	46	42	48	44
Rest of province .	48	49	54	52	51	61	58	71	70

and on the lens and vitreous (mainly cataracts); and six operations for which any change was less likely to be due to need or access than to other factors, namely, hysterectomy, cholecystectomy, appendectomy, haemorrhoidectomy, and rhinoplasty.

Mastectomy and prostatectomy were carried out with equal frequency in both regions and have increased steadily since 1966, unaffected by QHI. Operations on the lens and vitreous, mainly for cataract, showed a similar pattern. Hernia rates in Montreal showed no clear change following QHI, but there was some evidence of an upward trend in the rest of the province.

Operations on the tonsils and adenoids decreased steeply in frequency during the years 1966-70. In Montreal the trend was unaffected by QHI, but outside Montreal, where the rates were much higher in all years, there was a substantial rise in the number of operations in 1971, followed by a return to the earlier downward trend. Hysterectomy and cholecystectomy showed a rising trend throughout the period studied, but since QHI, the rates in the rest of the province have increased much more rapidly than in Montreal. Appendectomy rates have shown no consistent pattern in the nine-year period. Haemorrhoidectomy and rhinoplasty became somewhat more frequent operations in both regions after QHI.

Length of stay

The average length of hospital stay in Montreal, which had remained steady at just over 16 days in 1966 through 1969, began to decrease in 1970 and fell

to 15.2 days in 1972. In the rest of the province, the mean length of stay was shorter—14.6 days in 1966, and 13.6 days in 1970. In 1971 and 1972, these rose to 15.7 days and 15.5 days, respectively, but dropped again to 14.1 days in 1973. This appeared to be due to a reduction in length of stay for certain operations, for example, hysterectomy, which fell from 14.6 days in 1970, to 12.3 days in 1972, and to an increased number of operations which required only a short stay.

Comment

The increase in surgical operations and the differences observed between Montreal and the rest of the province in the rates of specific operations, cannot be ascribed to differences in the prevalence of disease or age distribution. Bed availability was much the same in the two regions, and there was little change during the period. The numbers of practicing physicians in different specialties remained about the same. Thus, there is no obvious explanation for the regional differences in the frequency of operations for tonsils and adenoids, in appendectomy or in herniorrhaphy, all of which were present before QHI. Neither is there any obvious reason for the difference in cholecystectomy and hysterectomy which have developed since QHI.

Effects on health

Health insurance is primarily concerned with the social objective of providing equal access to medical care, regardless of income. It is generally believed that medical care is beneficial and that more ready access may be expected to improve health. This belief entails a number of assumptions of which perhaps the most important is that before health insurance, financial barriers stood between some sick persons and treatment which could in fact have cured or alleviated their disease.

Our surveys were primarily concerned with the effects of health insurance on the behavior of doctors and the public rather than with the much more difficult task of measuring its impact on morbidity and mortality. Reference has already been made to the series of questions about common symptoms for which it is generally believed that medical advice should be sought. An increase in doctor visits for these complaints was observed, and they were more evenly distributed by income. Similar trends were seen in prenatal and postnatal care. This suggests that more people obtained help when medical care was needed and potentially useful. In children, this redistribution was less evident, and there was a general fall in the rate of visits. This change is disturbing.

Changes in consultation rates with physicians are not necessarily related to health since this depends more on the quality and effectiveness of the care given. It is most unlikely that the relatively small alterations in frequency and circumstance of doctor-patient contacts since 1969 could have had any detectable effect on death rates. Mortality is an extremely insensitive index of the effectiveness of medical care and is influenced by other, more potent social, economic and demographic factors. Nevertheless, we thought it important to examine the question carefully and to this end, made a detailed analysis of age-specific and age-standardized death rates by cause in the province for the years 1963 through 1973. A steady fall in infant mortality was interrupted by a relatively high figure in 1970, but in 1971, the trend fell back into line. A dramatic improvement in mortality ascribed to genito-urinary diseases, was undisturbed by the introduction of QHI. The one possible reflection of health insurance was an accelerated rate of fall in maternal mortality since 1969. As expected, therefore, there was little or no evidence of any important impact on mortality in the province.

Summary

Surveys of households, physicians, and emergency rooms, and a review of hospital admissions were conducted in metropolitan Montreal before and after the introduction of Quebec Health Insurance (QHI) in November 1970. Following QHI there was no overall increase in utilization of physicians' services, but a considerable redistribution with increased use by persons in low income families. Before QHI there was an economic gradient in the proportion of persons who consulted a physician for selected symptoms thought to require medical advice, but this was virtually eliminated after QHI. Physicians worked an average 8.8 hours a day after QHI, compared with 10.3 hours a day before. They saw a larger number of patients in their offices, but reduced telephone consultations and cut home visits severely. A considerable increase in the use of emergency rooms was observed and in certain surgical operations, but there was no evidence of a decrease in hospital admissions. So far the effect on health of this social legislation cannot be established.

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16. Abstracts
A series of surveys was carried out in the Montreal Metropolitan area before and after the introduction of the Quebec universal health insurance plan (QHI), to study its effect on use of four major aspects of health services: (1) physician services by the general population; (2) physician workload; (3) emergency rooms; and (4) a hospitalization and surgical study. Results of this study indicate no overall increase in the utilization of physicians' services, but a considerable redistribution, by low-income families. This resulted in relative parity of utilization across socio-economic levels Physicians' average work day declined from 10.3 hours before QHI to 8.8 hours, with an increased patient load that resulted from a reduction in home visits and telephone consultations. A marked increase in use of emergency rooms was noted following the introduction of QHI, and there was some increase in certain elective surgical procedures.

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